THE OPTICAL MAGIC LANTERN JOURNAL AND PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

Vol. 3.—No. 38. [Entered at Stationers' Hall.] JULY 1, 1892. Price One Penny.

CONTENTS.

PAGE
Notes 75
Hand-Cameras for Obtaining Slides for the Lantern 76
An Amateur Saturator and Jet 77
Artistic Lantern Slides 78
Jottings on Lantern Manipulation 81
Saturators and Patent Rights 83
Editorial Table 85
Correspondence—
  The Life of a Gas Cylinder 86
  A Free Gift to all Lanternists... 86
  Illuminated Fountains... 86
Notes and Queries 86

Notices.

THE *Optical Magic Lantern Journal and Photographic Enlarger* is issued on the 1st of every month, price One Penny, and may be obtained from all Newsvendors, Railway News Stalls, Photographic Dealers, or from the Publishers, at the following rates, post free :—

		Continental.	United States.
12 months ...	1/6 ...	2/-	60 cents.
Single copies...	-/1½ ...	-/2	6 „

Advertisements (Scale of Charges), displayed :—

	£	s.	d.
Front and back pages, by arrangement.			
Ordinary page (whole)	3	0	0
„ „ (half)	1	15	0
„ „ (quarter)	1	0	0
„ „ (eighth)		10	0
„ „ per 1 inch in column ...		6	0
„ „ „ ½ „ „ ...		3	0

Special quotations for a series.

EXCHANGE Column, General Wants, &c. (not Trade)—First 20 words, 6d.; and for every 3 additional words, 1d.

ADVERTISEMENTS must reach the office not later than the 24th of each month. All cheques and postal orders to be made payable to Taylor Brothers.

EDITORIAL communications must be addressed, The Editor; advertisements and business communications to Taylor Brothers, care of the Publishers, Dorset Works, Salisbury Square, Fleet Street, London, E.C.

American Agents:—The International News Co., 83 and 85, Duane Street, New York City.

Notes.

MANY of our societies might take a lesson from the Detroit Lantern Club (U.S.A.). This society has only twelve members, yet, so enthusiastic are they, that they give a weekly entertainment for over a hundred visitors, and, at intervals, a "children's evening" is provided.

* * *

THE exhibition of the Photo Society of Great Britain will be held at 5a, Pall Mall, from September 24 to November 10. Exhibits, including pictures, negatives, transparencies, lantern slides, apparatus, and appliances, will under no circumstances be accepted after the evening of September 14. As usual, lantern slides will be projected by the society's lantern. For this purpose the loan of slides is invited. These must reach the committee at least one week before the evening of their being shown in the lantern.

* * *

IT is stated that it has been decided in St. Pancras to supply electricity at threepence per unit, which is equivalent to gas at two shillings and sixpence to two shillings and ninepence per one thousand cubic feet.

* * *

ON the 16th ult. a lecture was given at Stationers' Hall, the subject being illustrated with lantern slides. This is, we believe, the first time that the lantern has lent its aid at lectures at this institution. We may take it for granted that in time sermons in churches will be illustrated with the lantern, and that the church lanternist will be as important an individual as the organist.

* * *

THE fifth annual exhibition of the Photographic Society of India will be held at Calcutta in December.

* * *

THE usual cylinders for compressed gas in use in America, are huge, boiler-like affairs compared to the small steel cylinders employed in this country; but as the superiority of the latter has begun to dawn on our Cousins, it is expected that they will rapidly take the place of those which are rivetted.

* * *

A GOOD varnish for collodion lantern slides consists of a solution of gelatine in strong acetic acid, and which is then thinned with water until it becomes of the consistency of syrup; this is poured on the plate in the ordinary manner.

* * *

MR. FRANK HOWARD gives the following precautions for avoiding the smell so often noticeable with oil lanterns. When the lamp is done with, the oil that can be got to run out should be poured off; then the wicks must be re-lighted and allowed to burn right out. It must not be charged with oil again until it is in position and about to be used. No smell of any dlsagreeable character will thus be noticed.

* * *

ALUMINIUM is recommended to take the place of magnesium for lighting, as it burns slower and without smoke. The powder is projected into the flame of an oxygen jet, and the composition, which is found to work with good results, is:—

Powdered aluminium...	...	100 parts.
Lycopodium	...	25 ,,
Nitrate of ammonium	...	5 ,,

* * *

THE following readers of papers (Session 1891-2) have been awarded the Society of Art's silver medal: Prof. Thompson, F.R.S., "Measurement of Lenses"; G. H. Robertson, F.C.S., "Secondary Batteries"; Captain Younghusband, "The Pamirs"; Prof. V. B. Lewes, "Spontaneous Ignition of Coal"; R. S. McCormack, "Trade Relations of Britain and U.S."; Captain W. de W. Abney, C.B., F.R.S., "Colour Blindness"; F. E. Ives, "Composite Heliochromy."

* * *

THE Photographic Convention will meet at Edinburgh on 11th inst. The proceedings will commence at 6.30 in the hall of the Geographical Society, during which a lantern exhibition will take place. The 12th inst. will be devoted to outings; 13th is what is called "the technical day"; 14th, excursion and lectures; 15th, pleasure, including a dinner and smoking concert; 16th, meeting of officers only.

* * *

THE Eastman Company of New York has lately been consolidated with the New Process Film Co., under the name of the Eastman Kodak Co., N.Y.

* * *

IT is announced that iron rust, contrary to the common statement, is not always a hydrated sesqui-oxide of iron. Prof. Liversedge has collected a number of specimens of rust, and in almost every case has found more or less magnetic oxide which has been attracted by a magnet.

Hand-Cameras for Obtaining Slides for the Lantern.

	"Facile" ...	(Fallowfield)	see	March	1st,	1890.
No. 1	"Giah"	(Mawson & Swan)	,,	May	1st,	,,
,, 2	"Quadrant" ...	(W. H. Humphries & Co.)	,,	June	1st,	,,
,, 3	"Eclipse" ...	(J. F. Shew & Co.)... ...	,,	July	1st,	,,
,, 4	"Eureka" ...	(W. W. Rouch & Co.) ...	,,	Aug.	1st,	,,
,, 5	"Key"	(Platinotype Co.)	,,	Sept.	1st,	,,
,, 6	"Optimus" ...	(Perken, Son & Rayment)	,,	Oct.	1st,	,,
,, 7	"The Griffin"	(Griffin & Sons, Limited)	,,	Nov.	1st,	,,
,, 8	"The Swinden-Earp" Patent	... ...	,,	Dec.	1st,	,,
,, 9	"Collins" ...	(C. G. Collins) ...	,,	Feb.	1st,	1891.
,, 10	"Kodak" ...	(Eastman Co.)	,,	Mar.	1st,	,,
,, 11	"Guinea" ...	(Walter Griffith)	,,	April	1st,	,,
,, 12	"Vanneck" ...	(Watson & Sons)... ...	,,	May	1st,	,,
,, 13	"Chadwicks"	(W. I. Chadwick) ...	,,	June	1st,	,,
,, 14	"Bonanza" ...	(R. & A. J. Mercer) ...	,,	July	1st,	,,
,, 15	"Repeater" ...	(J. F. Shew & Co) ...	,,	Aug.	1st,	,,
,, 16	"Marvel" ...	(Wilson & Son)	,,	Sept	1st,	,
,, 17	"Talmer" ...	(Talbot & Eamer) ...	,,	Oct.	1st,	,,
,, 18	"The Omnigraph"	(J. Lancaster & Son)...	,,	Nov.	1st,	,,
,, 19	"Ubique" ...	(Perken, Son & Rayment)	,,	May	1st,	1892.
,, 20	"Daylight Kodak"	(Eastman Company)	,,	June	1st,	,,

No. 21.—"THE RADIAL."

ONE of the many advantages of the Radial Hand-Camera introduced by Messrs. Marion, of Soho-square, is that it is possible to carry a supply of plates of varying rapidity, and to expose any particular plate according to the nature of the subject. It will thus be seen that it is not necessary that the plates be exposed merely in rotation according to their order in the magazine portion of the camera.

The plates are inserted without any backing or sheaths in a series of grooves, which are exposed to view by removing the back of the instrument; these grooves radiate from a common centre, this centre being the pivot on which the exposing plane turns (see E, Fig 1).

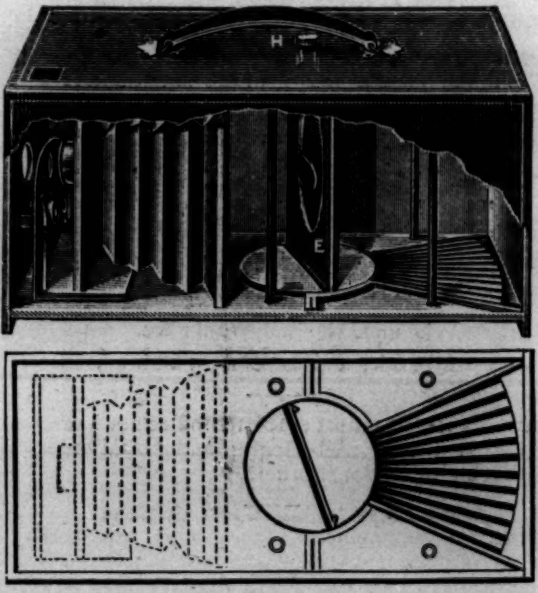


FIG. 1.

The grooves spoken of are made of metal, so there is no chance of a plate sticking, or the accuracy of the fittings getting out of order.

We will suppose twelve plates to have been placed in the grooved reservoir; let us then understand the method by which these, or indeed any particular one, is brought into position for exposure, and subsequently returned to its place. Say, for instance, it is desired to expose plate No. 7, the indicator at bottom of camera (underneath) is set at that figure (see A, Fig. 2). This turns the exposing plane E, Fig. 1, so that the grooves with which it is furnished are in exact line with those of No. 7 of the radial reservoir.

The camera is now slightly tilted, which would cause the plate to slide from its place into the exposing plane, but to avoid the possibility of the plate going backwards or forwards at random, it is prevented from sliding into place until a spring catch, closing the opening of focussing plane, is liberated. This is effected by a very slight turn of the milled head on the top of camera (see H, Fig. 1). Immediately the knob is liberated the plate is locked in position.

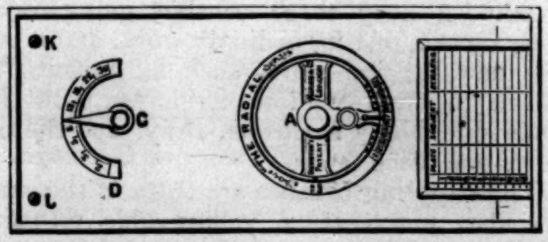


FIG. 2.

The arm A, Fig. 2, is then pointed to the words "*to expose.*" The particular plate is now opposite the lens ready for exposure, after which it is returned to its receptacle by turning A to 7, inclining the camera, and touching the spring H. The whole movement described being effected in a few seconds.

The lens of the camera is a rapid rectilinear, with rotating diaphragm, and is provided with an excellent shutter, Fig. 3, placed immediately in front. The terminals of the two cords for setting and releasing the shutter are shown at K and J, Fig. 2.

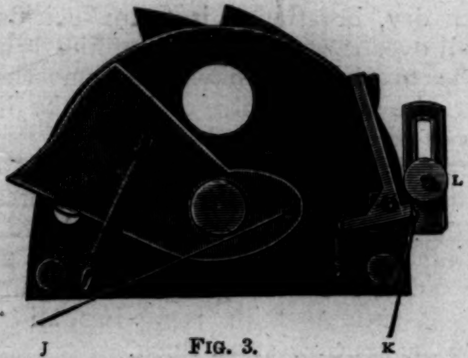


FIG. 3.

This shutter can be used at varying speeds by adjusting the screw L, and for time exposures the lens can be left open by pulling the cord J until one click is heard. It is closed by a touch on K.

Referring to Fig. 2, a pointer C will be seen, also a scale D, representing in yards the required position at which the pointer may be set for focussing any particular object.

Horizontal and vertical finders are fitted, and the particular camera which we have is ebonised mahogany, quarter-plate size, but the same instrument is also made for half-plate and lantern size.

After carefully examining the camera inside and out, one cannot help noticing how strongly and neatly it is made. Climatic influence should have no effect upon such an excellent instrument.

—:o:—

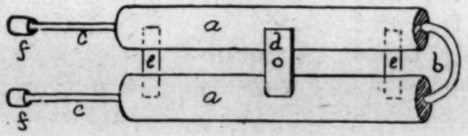
An Amateur Saturator and Jet.

By CLERICUS.

IN complying with the Editor's invitation to give a few particulars of the above, I must premise that I have nothing striking or original to offer. Experts will no doubt discover much that is open to criticism. Even amateurs, for whom I write, may very likely be able to modify some of the details with advantage. I wish simply to show that with ordinary appliances, and at a very small cost, an apparatus may be made, which, having been found useful by myself, I believe others will be glad to possess.

The Saturator.—The construction is shown by Fig. 1, which requires but little explanation.

FIG. 1.



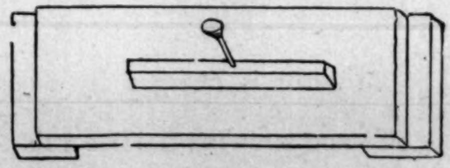


FIG. 2.

The main part is formed of two brass tubes (*a*|*a*) 2in. in diameter and 12in. long. Into each end of these is soldered a disc of brass with an opening in the middle to admit the smaller tubes *b* and *c c*. The tube *b* is about 6in. long and three-eighths inches in diameter, and is best made of copper, which bends more easily than brass. This should first be bent into the shape represented, and two of the discs soldered upon the ends. These discs are then soldered, each into one end of the large tubes, taking care to get the several parts true to each other. In soldering the discs in, I found it best to level the edge of the disc, and also the inner edge of the tube, so as to form a channel round the circumference into which the solder is run. Otherwise the disc may be fixed about one-sixteenth inch below the extreme end of the tube, and the solder run into the angle so formed. But the other is the neater plan.

The large tubes should now be secured by soldering on the three ties *d* and *e e*, the former of stout brass with a hole through the centre to receive a thumb-screw; and the latter *e e* on the under side, as near the ends as possible. These may be of thinner material.

Next comes the packing of the tubes. Make two rolls of flannel—old blanket will do well—just enough to fill the main tubes, rolling it round a spiral wire so as to leave a free passage through the middle. When these are put in, the other ends may be made and fixed, and the working part of the apparatus is complete. The tubes *c c* are about three inches long and some three-eighths diameter. The free ends have a screw-thread cut upon them, and caps *f f* are made to screw over them. These screws I cut in the lathe with screw-tools. They may, of course, be cut with a tap and die. If, however, the amateur has no means of cutting them, two sound corks, well fitted into the tubes, will serve the purpose.

The stand, Fig. 2, is a very simple matter. A piece of half-inch mahogany is all that is needed, with cross pieces at the ends to keep it from warping, and to serve as feet. A strip is fastened down the middle, long enough to fit between the lower ties, and tapered so as to fit closely between the large tubes. A thumb-screw passes through the upper-tie, and working in a nut or bush in the strip, will secure the brass part to the stand. Sometimes it will be quite as convenient to dispense with the stand altogether. The question of polishing, &c., I may leave to the individual taste.

The saturator is charged by pouring into it about a pint of methylated ether—both caps being off—and allowing the free fluid to drain out into a funnel. The ends are then tightly closed, and it is ready for use.

In another paper I purpose to describe the jet, and give a few hints as to the working of the apparatus.

Artistic Lantern Slides.

By H. M. J. Underhill (Oxford).

No. 2.—PAINTING.

(*Continued from page 68.*)

We now come to *painting*. Ordinary moist water-colours are used, but only the transparent kinds. Of these I have a great deal to say presently. You will need two kinds of brushes, one sort for painting, the other for softening, or stippling. I have tried three makers, and Winsor and Newton are the only makers who make really good brushes adapted for slide painting, and of theirs only about one in four is really perfect. My way of choosing them is to make friends with the local artist's colourman. He then gets down a couple of dozen new No. 1 size yellow sables (No. 0 are too small). He lets me try these—a few minutes' painting does them no harm—and I choose say six that seem to have perfect points, the rest I return. I keep three brushes going, one for rough work, one for ordinary work, and a perfect one, new, for fine work, such as finishing faces. When the best one loses its perfect point I take a new one, No. 3 is thrown away, and the others move one place down.

The stippling brushes are three of the smallest size flat, *short-haired*, yellow-sable oil-painting brushes, and one or two of larger size.

No precise directions can be given for painting, as the method must vary a little according to the subject. Always begin at the top of the picture, and be sure and finish the background before the principal objects of the picture have any paint put on them. Let us suppose we are painting a landscape with figures in the foreground. The first thing is the sky. Paint it in very thin with No. 3 brush. You will find it impossible to lay on a smooth wash of colour, as you do on paper, for brush-marks will show themselves. Never mind. Let the paint dry. When dry, breathe on it to make it damp, and dab all over it with a dry stippling brush, until all the brush-marks have been smoothed away. When the paint is thin, as it will be in a sky, this can be done perfectly.

High lights on clouds can be picked out with the moistened point of ink-eraser aforesaid, and a damp brush, but it is best to leave them, if you can. The thicker the coat of paint the more difficult it is to get it smooth, and I have not yet succeeded in removing all "grain" where the paint is at all thick.

Now paint in the landscape on the horizon and all round the figures. The ground coat of paint should be done lightly; then stipple this in order to smooth it; next put in the darker shadows and smooth them also with the stippling brushes. Finally, add the darkest parts and fetch up the highest lights, and stipple again if necessary. When the stippling brushes become too clogged with paint, they must be washed out and allowed to dry. That is why it is needful to have three in use—so that one is always found clean and dry. The figures will be painted in the same manner as the background, but if you want them to stand out well on the screen, you must be careful to keep your background "tender," as artists say, and your figures "forcible." Finally, the foreground underneath the figures must be painted, and if your fingers have rested on the glass in this part and made it greasy, the grease may be removed by benzine.

If you want to make scientific diagrams there will be no background, of course; and if you are in a hurry, they may be shaded with the 6-H pencil and just tinted with colour. Naturally, however, they look much better shaded and painted up properly with colour. Sometimes it is useful to have a bright figure on a black background. This is not difficult to make. Squeeze some Payne's grey paint from the tube on to the slide (it works better than black), and with a large brush, damp but not wet, spread and dab the paint all over the slide until an evenly opaque surface has been obtained. If the figure is bulky it should be drawn on the slide first as usual, and left uncoloured by the grey; if it consists chiefly of lines, the slide must be wholly covered with the paint. Then scratch out the figure—moistening the paint all the while by breathing on it—by means of penknife, fine and coarse needles, the point of the brush handle, and the wet brush itself, as required. These implements are also used in picture-slides, for picking out high lights and that sort of thing.

Up till this point the slide is only semi-transparent and will not show in the lantern. Varnish will make it perfectly transparent. I use Winsor and Newton's Mastic Picture Varnish, because it is the palest. In varnishing slides, you will learn that your great enemy is dust, it gets into the paint, and whenever you see even the tiniest hair whilst the painting goes on, immediately pick it off with a needle. Promptness then saves trouble afterwards. But despite all care, there be a good deal of dust on the slide when the painting is finished. Dry it thoroughly before a gas-stove, or over a spirit lamp. Then brush it well with a stiff large hog-hair brush and pick off obstinate hairs with a needle. Pour some benzine on the slide and drain it off. Immediately the moisture will reveal half-a-dozen more points of dust sticking up. These, if in a place where the paint is thin, will show on the screen, and they must therefore be removed with needle and brush, and the paint mended, if damaged. Finally, when you have removed every atom of dust, pour on the varnish, and, when the whole slide is covered, pour it off again at one corner. However great the care you take, you will find that a point or two of dust has escaped your notice. If these occur in a transparent part of the slide, it is best to wash off the varnish with benzine and remove them; but if they are where the paint is thick, leave them, for they will not show. Now lean the slide against something to drain, face inwards, of course. My place is against the wall on a mantelpiece, with a strip of three or four thicknesses of paper underneath, to absorb the varnish. Leave the slide thus for a few hours. It must then be dried by heat. This is quite necessary, for if allowed to dry naturally the turpentine in the varnish never quite dries out, and the heat of the lantern, when the slide is used, will cause turpentine vapour to form over the surface of the picture and render it foggy. This spoils the slide, until it has been re-varnished. A gentle regular heat of some hours' duration is what is required. A good plan is to place the slide before an ordinary gas-stove when you go to bed. The stove is turned low, and the slide put a foot or eighteen inches away; a temperature of about 140deg. Fahr. is thus maintained. When you get up in the morning the slide is ready for covering.

If not dried enough, the turpentine vapour before-mentioned will probably appear some time when you are giving an exhibition. If overheated, the varnish will dry in wrinkles; but if it cracks like crackled china this does not matter, unless the cracks are coarse enough to show on the screen. If the varnish be wrinkled, or the slide damaged in any other way, the varnish may be removed by soaking the slide in benzine, and another coat put on.

When covering the slide, be careful to brush all dust from the varnish with a very soft large paint-brush, and not to let the cover glass touch it. A little bit of card as thick as a visiting card placed at each corner of the slide and fastened by gum will, with the ordinary mask, keep the cover from touching the varnish If it touches, the two glasses will stick together, and the varnish will frizzle up and become opaque in such places as the cover touches it. All traces of varnish or turpentine on the back of the slide must be carefully cleaned off, or the binding paper will not stick.

Now as to *paints*. I have tried very nearly every transparent or semi-transparent colour in Winsor and Newton's list. Colours do not be-have in quite the same way under varnish on glass as they do on paper. Several that are fairly permanent on paper fade quickly on glass, and *vice versa*. I cannot mention all, and if there are any colours not favourably spoken of here, they are probably useless for some reason or other. This is my list, and I always use sixpenny tubes:—

Lamp-black.—This is good; ivory black is useless, because it is too gummy. Lamp-black, when put on thin enough to be grey, is transparent.

Payne's Grey.—This is the nicest colour in the whole paint-box to work with. It is perfect in every respect, and will mix with everything.

BROWNS.—*Sepia*.—Transparent; necessary, but not nice, because it is gummy.

Vandyke Brown.—A very nice transparent colour.

Raw Umber.—Very good and workable, but a weak colour. Burnt umber I have not used.

Burnt Sienna.—A good colour, but only semi-transparent. Therefore it must be used with great care, for if put on too thickly the picture will appear much darker on the screen than you think for.

YELLOWS.—There is no really nice yellow available. *Raw sienna* has to do, because there is nothing else: it is only semi-transparent, like burnt sienna. Indian yellow and Chinese orange are lovely colours, but quite useless, because they fade in six weeks after the slide is finished. *Gamboge* is the only bright yellow; but it is a resinous colour, and so washes out immediately the varnish touches the slide. A little gum mixed with the water prevents this; but then it is very difficult, almost impossible, to "stipple" it. But it is the only colour for grass. I use it thus: The grass, &c., is, as one may say, indicated, by a very thin coat of raw sienna, and shaded with Payne's grey, in order that you may see how you are going on whilst the slide is being painted; but, if possible, I do not touch the picture with the gamboge until the very last thing, when the slide is otherwise finished. Breathing on the slide to stipple the other colours makes any previously-painted gamboge shrink up into clots. Then, just before varnishing, I brighten up the grass with gamboge and Prussian blue mixed with gum-water. Gamboge is an ugly colour on paper but a pretty tint on glass.

BLUES.—*Prussian blue*. This is one's sheet-anchor for blues, and it is a pleasant tint on glass. It is beautifully transparent. It is apparently permanent when used by itself, or when mixed with black, Payne's grey, crimson lake, or Vandyke brown. Curiously enough, it fades in six weeks when mixed with raw sienna, or with that new colour, alizarin crimson. This is very tiresome, for mixed with raw sienna it makes a lovely tint of green. *New blue* works well; but it is not a very nice tint, and when mixed with raw sienna for green, although it does not fade, it becomes opaque.

GREENS.—There are no transparent greens which can be used. You must make up green as well as you can with Prussian blue and Vandyke brown, new blue and raw sienna, and Prussian blue and gamboge.

REDS.—*Alizarin crimson* is a splendid colour by itself; but it is too gummy to work well, and it has the fatal defect of causing Prussian blue to fade when mixed to form purple. *Crimson lake* is a much nicer colour in every way. It is transparent, works well, and will mix with anything. Not being exposed to light (in lantern slides), it is, as far as I know, permanent. Slides painted with it several years ago have not faded in the least. A fairly good scarlet can be obtained by mixing it with burnt sienna. The same mixture, but in different proportions, and laid on thinly, is the best flesh colour. There is no good orange, and lake and burnt sienna is a brighter scarlet than lake and gamboge. It makes good violets and purples, mixed with Payne's grey and Prussian blue, and for shadows of flesh tints it should be mixed with Payne's grey and Vandyke brown, or with black, and not with sepia.

I may add a few words in conclusion. Some photographic friend may ask you whether this process of painting is worth the trouble. That depends. The man who can paint always looks down on the photographer a little, and I do not pretend that I do not think photographs rather "*infra dig*." A good photograph is better than a bad painting, but it is generally allowed that a good painting is greatly superior to a good photograph; and painted lantern slides have just the same kind of superiority over photographic ones, and no more. So I think that it is worth while to paint these pictures.

As for scientific lectures, many illustrations cannot be photographed direct from the object, but must be photographed from pictures or drawings. It is much less trouble, and the results are much superior, when you make the drawing directly on the slide. With the microscope, again, a drawing is much more effective, and, in most things, more accurate than a photograph.

Of course photography has its province, and within this, painting cannot touch it; just as in other things, photography can make no approach to the excellence of painting.

In painting pictures you must be careful to make up your mind at first as to how you are going to treat your subject and paint your picture. Any doubt or hesitation is fatal to the success of the slide; and if you have an idea that you can leave your outline undecided, and then "knock it into shape" when you come to the colour, you may be quite sure that when your picture appears on the screen, it will look quite different from what you expect, and will be dirty, dull, and confused. But a well-painted picture, with all its tints properly graduated, so that it is really brilliant, and not crude and garish in colour, will look brighter on the screen when shown with an ordinary blow-through jet, than a photograph shown with a mixed-gas jet, or even ethoxo-lime-light.

:o:

Jottings on Lantern Manipulation.

By G. R. Baker.

With a subject like the manipulation of the optical lantern, one is somewhat at a loss to know what to include and what to leave out when treating the matter technically, for some elementary matters must of necessity be touched upon. I shall, however, try to give the results of my own experience, rather than a complete *résumé* of what can be accomplished by the optical lantern, for the lantern world have already had lectures, papers, and demonstrations by such well-known men as Messrs. A. Pringle, Nelson, Traill Taylor, &c., besides which, many books are accessible to lantern workers, and last, but not least, we have *The Optical Magic Lantern Journal* each month, which will show students and others the scientific and educational uses to which projection apparatus can be put.

The first necessity is a good and powerful light, and although fair, if not very good, results can be obtained from mineral oil lamps, with three and four wicks, I venture to predict that for all public work, or even for home use on a small scale, they will be entirely superseded by the electric and lime-light before many years have passed.

This is distinctly an age of progress, and the great aim of everybody is to get efficiency at a saving of labour. The introduction of compressed gas in cylinders, at a very small cost, has almost entirely stopped the manufacture of oxygen for private use; and in like manner, the general adoption of electricity will, in a few years, give us means, by simply turning on a switch, of having a light for our lantern or any other projection that may be required.

The heat, bad smells, and general discomfort of working with a powerful paraffin lamp is intensified after a long interval of working with the lime-light, when for some purpose one has to resort to it, and perhaps I shall be best employed by endeavouring to dispel a few of the doubts and

Fallacies Connected with the Lime-light, and its Safe Use in Public or Private, and also Give Some Hints Respecting Apparatus.

1st. As regards danger, Oxygen cannot explode by itself.

2nd. If a constant pressure is kept up, no one need fear to use the two gases under pressure in separate cylinders, with the same confidence if not more, than with the blow-through jet and one gas (oxygen) in a bag.

3rd. The jet must not have too large an orifice in the nipple for the pressure used.

4th. With a Fleming's Safety Explosive Gas Tester the operator may always know if he has pure gas or not.

5th. A cut-off arrangement prevents interference with taps, after once adjusted for best light.

6th. The modified method of using the gauge so that contents of cylinder may be known without submitting such gauge to undue strain.

7th. Fixing of tubes.

As regards oxygen, what risk do users of compressed oxygen gas run? If the companies test the cylinder to twice the pressure of gas pumped into same, then if there is no deterioration of the cylinder and care is taken of it in transit, there should be no element of danger here. Owing, however, to the apparent strength of these cylinders, users and carriers of them had already began to treat them contemptuously, when one or two incidents occurred that acted as cautions, and showed how necessary it is to take care of anything that is useful. Is it taking care of a cylinder when filled with gas, and fitted with a comparatively delicate part known as the valve, to pitch it about as if it were a piece of timber or bale of wool, or violently stand it down on its valve end? No; and when, as happened some little time since an injury resulted to the valve and the gas escaped with sufficient violence to clear a railway station platform—it shows *that on no account* should a finished cylinder after testing either with or without gas in—be sent by rail or carrier otherwise than in a box or protecting crate; for it must be borne in mind that the strength of a vessel is represented by its weakest part, and that in this case is the valve. Other small accidents have happened to cylinders damaged in transit, but in no case have I had any difficulty, or know exhibitors to have difficulty when the cylinders have been taken care of.

The leather portmanteaus for pair, or the wooden boxes with fall-down flaps, ensure the gas "kit" being complete, and if a single cylinder is taken of small size a wicker-work basket will be sufficient protection.

To KEEP UP A CONSTANT PRESSURE is easy enough now we have such regulators as Beard's Automatic and the "Duplex," the springs of which, to regulate the supply, can be made to pair exactly. This latter, although desirable in dissolving and better for general security, is not absolutely necessary, for I have worked with the pressure on one gas three times as great as that on the other, but neither less than a fair working pressure, say six to eight inches of water. With Beard's regulators, the springs are generally set to eighteen to twenty-four inches water pressure, and hence the chance of getting back pressure is *nil*.

The nipple of mixed gas-jets should not be too large for the pressure used, for I proved conclusively, by a series of experiments I carried out in connection with Mr. James, then of Watford, that the orifice must be proportionate to the pressure, not only for the sake of the light, but for safety in use. With two fifty-six pound weights on the bags, under a double-pressure board, an aperture of one-twentieth of an inch is perfectly safe, or if used with a good mixing space, and by an expert operator, one-eighteenth of an inch. If with Beard's regulator and compressed gas, one-sixteenth of an inch can be safely used, and for special purposes and in expert hands, one-fourteenth or even one-twelfth is possible.

In the opinion of several experts, the light can never run back beyond the mixing chamber or dissolver when using cylinders and automatic regulators with a pressure similar to that mentioned.

After the deplorable accident at Ilkeston, it is more than ever necessary to test the gas before use to see that it is pure, or not by any accident or oversight mixed. This is easily done by the use of the Fleming's Safety Explosive Gas Tester, for if the gas was in any way mixed it would pop or explode, while hydrogen, or house gas, will burn as a flame, and oxygen fan glowing paper into a flame. The method of using this tester is exceedingly simple and perfectly harmless, while some of the tests suggested at various times have been open to the objection of containing too much mixed gas, and also having portions that would blow away. The water pressure here exerted ensures delivery of gas, and also renders the explosion harmless if the gas happen to be mixed.

A CUT-OFF ARRANGEMENT is a decided acquisition to any single lantern, or to a bi-unial lantern not having two four-way dissolvers; for after once the taps have been adjusted to the best position, it is only necessary to turn the cut-off lever off or on.

I suggested the use of the four-way dissolving tap for this purpose many years ago, and the Pringle cut-off and others attached to the jet itself having the same object in view are most useful for single lanterns.

PRESSURE GAUGES.—The method of using pressure gauges has been a source of danger and actual injury to several persons, and in most cases because of the presence of oil in the gauge or fitting, and the sudden turning-on of the oxygen. The great preventative of similar accidents occurring again is never to have a perfectly sound joint when first turning on the valve of the cylinder, or else first turn on the cylinder a little until there is just a small whistle from the gas heard, and make the connection gas tight afterwards by clamping up the unions of regulator, gauge, &c.

No matter how expert the operator may be he cannot always turn on the cylinder valve slowly, and consequently if there is no escape for the excess pressure by the sudden opening of the valve, it exerts an undue pressure on the gauge or regulator that generates a great heat which will fire any hydro-carbon or inflammable material, or even metal.

If, as I said before, the joint is not quite gas-tight, it can be opened with impunity. In fact, the hardest valve can be opened. What does it matter if a fraction of a foot of gas is lost in so opening the valve if security from harm or damage to apparatus is secured thereby?

JOINTS.—During operation the want of gas-tight joints is far more frequent than supposed by many, for they think that if the rubber tube fits fairly well it is all right. It wants a very good tube indeed for gas that is delivered at high pressure, and must not only be thick but pliable and elastic. Even then, owing to slight differences in the diameter of supply tubes, gas-jets, or dissolvers, &c., a tie on, or better still a "grip" clip, should be used to make quite sure the joint is sound and the connection gas-tight.

OTHER SOURCES OF LIGHT are the incandescent gas-light, the oxy-ether lime-light, and the oxy-calcium spirit light. The first for enlarging purposes, and certain special work is very good, but from the experience I have had with it I don't think any one would go to the trouble of keeping up the air supply by the pedal bellows, while they can get compressed gas and work the lime-light. For country places far removed from rail, or places abroad, it may serve a useful purpose in giving a moderately good light (somewhat better than oil), and the same applies to the oxy-ether, where a very strong light is required; but in the latter case I say most emphatically use pumice chambers to jets, or pumice-tubes immediately behind the taps of each jet. It is also very necessary to periodically renew the pumice, so that it may be of the same checking nature for the prevention of ignited gas passing, as originally.

CONDENSERS.—No matter how good a light may be, if the condensers are not of a suitable size and focus the best result for projection will not be obtained. What is the best size and focus is a question often asked, and can only be answered thoroughly when one knows the purpose to which it will be put. If for oil light and short focus front lenses only, then no doubt a four-inch condenser of the double plano-convex form, with the convex surfaces together is good enough, but the moment the objective used is of longer focus than six inches, the commercial condensers alluded to (which have a combined focus of about two inches) are too short. The one I like most for lantern work projection, and which I call a satisfactory "Universal" condenser, is one having a clear aperture of four and a-quarter inches diameter and a focus of, say, two and a-half inches. It consists of a meniscus lens next the light, and a double convex next the slide. This works well with any lens of from four and a-half up to twelve inches focus. Mr. J. H. Steward has recently constructed a triple condenser, that while giving about the same illumination and definition for ordinary standard photographic projection, is better for delicate optical projection, such as necessary for illustrating light, or with the microscope attachment, by giving a truer beam. The covering power of a condenser must be taken into account, for as the focus is shortened and the angle greater for light collecting, it will, when converging after passing through the condensing lens, illuminate a smaller area evenly at a given distance. As it has been proved by demonstration that with the lantern microscope, sub-stage condensers must have a focus to agree with the objective used, theoretically it should be so with the optical lantern ; but for practical purposes, in a lime-light lantern, a double condenser, such as described above, answers quite well for objectives of from six to twelve inches focus. If, however, the back lens of the triple condenser is removed, a normal focus is obtained by the remaining two, and a very short focus and wide angle made by the three, hence it forms a most useful condenser.

In some apparatus for enlarging purposes, the condensers are made oblong; but if required for lantern projection there is no economy of space if, as would often be the case, the picture sometimes taken with the long part of the plate as the width and another time as the height. The area of illumination will always be in a circle from the luminant, and therefore a circular condenser is not only naturally the best shape but most economical.

JETS.—The jet I usually employ is of the mixed gas form, with an improved chamber and conical nozzle, which permits of more perfect mixing of the gases when supplied from cylinders under high pressure, and also give more light than the ordinary kind. It is fitted with vertical and lateral adjustments and clamps, so as to be quite steady after once the best position is found.

MASKS.—It is seldom that slides are matted or masked so exactly that they will superimpose when dissolved one into the other, so metal masks can be fitted that have been carefully cut of the same size and shape, a trifle smaller than the smallest commercial size cushion-shaped or circular openings. The result of this is that all pictures are practically the same size when projected on the screen in either a square or circular series.

—:o:—

Saturators and Patent Rights.

BY A. PUMPHREY.

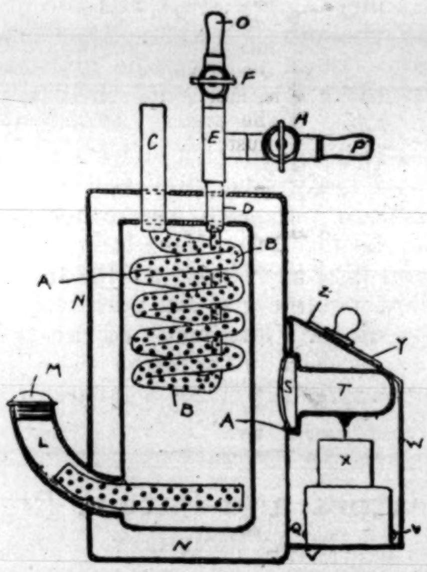
MR. SCOTT has put forward his claims as if patents were sealed and closed instruments, which no one could see or question. Seeing he gives in last Journal a quotation from his patent, I propose to question the position he takes up that Mr. Lawson's invention is covered by his patent.

It is well understood that a sound patent cannot be secured for any given principle. All that a patentee can secure is his method of using any new method or the application of any new facts. Thus, in the matter of depositing metals by a current from a battery as a patent, it fell through when the current from a magnetic machine was introduced.

Thus Mr. Scott cannot make a valid claim for the application of heat to generator, as, if his claim was good for that, no one could take a saturator into a warm room.

If Mr. Scott will read his own patent, he will find the following is his claim, and that alone—viz., "For a saturator for imparting hydrocarbon vapour to suitable gases for lime-light and other purposes substantially as described with reference to drawing."

A comparison of Mr. Lawson's ingenious contrivance with that of Mr. Scott's drawing will convince any novice that Mr. Scott's claim, as he puts it in your paper, is absurd. Not only that he goes so far as to imply that he has the exclusive right to using a stuffed chamber, whereas he recites in his patent so much of the *known* methods simply to make it clear how the thing can be done by any person who understands such matters, which is one of the conditions upon which a patent is granted, not that he has a right to all that is mentioned in the patent.



There are many ways in which a saturator can be warmed so as to give off the vapour, which are quite clear in Mr. Scott's patent, such as heating the air before it enters the vapouriser, enclosing the saturator in a non-conducting bag, with a hot bottle or brick above the saturator, the use of a current of warm water or steam enclosing or inside the air tube.

My own feeling is, that the day of saturators passed away with the introduction of compressed gases.

A saturator will save a few pence where gas cannot be bought, and is of use where compressed gases are not at hand; but if I were obliged to use one, it would not be Scott's, as, in my opinion, it is quite the wrong shape, and I have found it fail to give a constant supply of saturated vapour in consequence.

I trust no one will be prevented from making any experiments they incline to in consequence of the absurd claims of Mr. Scott.

Mr. Scott's patent can be had from the Patent Office for eightpence by any one, and readers can judge for themselves whether Mr. Lawson's design is at all like what Mr. Scott claims "as described with reference to drawing in the patent."

Herewith is an extract from Mr. Scott's specification; but, with reference to the cut, I should be inclined to think that when the stuffing had subsided a little, the gas that came in at B could go out at A without making the circuit:—

"No. 17,378, 1889.—The cylinder A closed at both ends is tightly packed or stuffed internally with wool or other suitable material capable of absorbing a large amount of hydrocarbon. In the upper part of the stuffed cylinder A is arranged a sinuous tube B, either perforated, as shown, or formed of a coil of wire provided with a jacket or covering consisting of tubular cotton wick. Pipes C and D are connected respectively to the ends of the tube B, the pipe D being connected to one end of a T-shaped pipe, E, having stop-cocks F and H on its other two ends. A third pipe L is connected to the cylinder A, at or near its bottom, and is provided with a screw cap M at its free end, the other end being connected to a short length of perforated pipe to conduct fluid readily to the stuffing. The stop-cocks F and H are provided with suitable shaped nozzles O and P for connecting to flexible tubing.

"When required to saturate gas with hydrocarbon vapour, the cap M is removed, and hydrocarbon fluid is poured in through the pipe L, and rises in the stuffing by capillary attraction, the surplus fluid being run back into the bottle through the pipe L. The screw cap M, which is provided with a leather or other washer, is then screwed on to the pipe L, to prevent leakage. This arrangement for introducing the hydrocarbon keeps the tube B in the upper part of the apparatus clear and open to the passage of the gas, consequently preventing bubbling and unsteadiness of the light.

"The pipe C is connected by a short rubber tube to the usual coal-gas or hydrogen nozzle of the jet or dissolving tap; the nozzle P is connected by a rubber tubing to a cylinder of compressed oxygen; and the nozzle O to the oxygen nozzle of the jet or dissolving tap. The stop-cocks in the pipes F and H are shut off and a cork put in the pipe C, when the apparatus is not in use, to prevent evaporation of the fluid. During use, the cork is removed, the cocks opened full, a portion of the oxygen going direct to the jet through the stop-cock F and a portion passing through the tube B, where it is saturated with hydrocarbon and passes thence to the jet, where it burns similarly to hydrogen or coal-gas.

"The vessel A is partially surrounded by a second vessel N, through which the pipes C, D, and L, pass, provided with openings at R and S. In the opening S is screwed a short tube T, closed at its outer end. A box W, removably attached to the cylinder N, covers the tube T, and also serves to contain a night-light X, or other suitable source of heat. The case N is filled with water, and when using the apparatus the light X is lighted and heats the water and consequently the upper part of the saturator cylinder A, and thus increases the amount of hydrocarbon vapour imparted to the oxygen. The products of combustion of the night-light escape at the openings Z, which can be closed by means of the plate Y, as clearly shown. The air for combustion is admitted through the openings V.

"If it be desired to heat the cylinder A by means of a current of air instead of water, the pipe T is unscrewed, the openings Z are closed by the plate Y. The heated products of combustion then pass through the opening S and circulate round the cylinder A, and pass off at R. If desired, the cylinder N may be filled with water to nearly the level of the opening S, or half filled with sand or other suitable material to prevent the lower part of the cylinder A being heated.

"Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

"(1) A saturator for imparting hydrocarbon vapour to suitable gases for lime-light and other purposes, consisting of a vessel provided with an inlet pipe for admitting the hydrocarbon fluid to the bottom of the saturator, and tightly packed with suitable material, in the upper part of which is a sinuous passage formed by a perforated or skeleton tube, and connected to suitable inlet and exit pipes for the gas, the whole arranged substantially as described with reference to the drawings.

"(2) A saturator for imparting hydrocarbon vapour to suitable gases for lime-light and other purposes, consisting of a packed vessel supplied with hydrocarbon liquid, and with inlet and exit pipes, by means of which the gas to be saturated can be passed through the said vessel, and of an outer casing surrounding, or partially surrounding, the packed vessel, and through which a current of hot air can be passed, or which is filled with water heated by a night-light or other suitable source of heat, the whole substantially as described with reference to the drawings.

"(3) A saturator for imparting hydrocarbon vapour to suitable gases for lime-light and other purposes substantially as described with reference to the drawings."

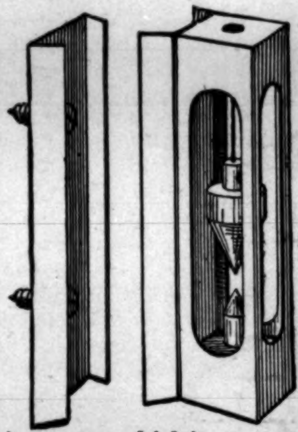
——:o:——

Some time ago we stated that Mr. Robt. C. Murray, late manager to Messrs. Griffin and Son, had opened premises at 8, Garrick-street. We have lately received a catalogue from him, which contains illustrations and details of a number of fine-looking cameras and other apparatus.

Editorial Table.

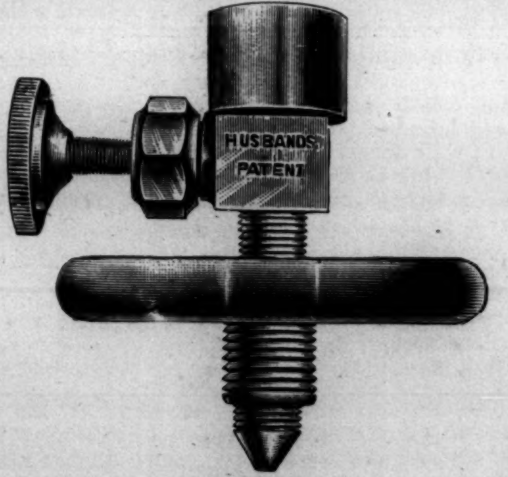
Spot Masks.—The Fry Manufacturing Company have sent us several samples of masks for lantern slides. These have various shaped openings, and are black on both sides, excepting two white spots on the upper end, and a small space on which to write the subject. The spots greatly facilitate the correct placing of slides in the lantern.

Camera Plummet.—When in Edinburgh a week or two ago, Mr. Baird, of Lothian-street, gave us a neatly-made and useful plummet to attach to our camera. The plummet is made of brass (stained). The part to the left-hand of illustration is screwed to side of camera, and the plummet shipped into place when required. For architectural subjects, copying, &c., it forms a useful adjunct.



Eastman's Gelatino-Chloride Printing Paper.—The Eastman Photo Manufacturing Company have just introduced an excellent printing paper, which is more sensitive than albumenised paper, and gives fine tones. We have made prints from some two dozen negatives, which we took three weeks ago in the Orkney Islands; these have toned a splendid colour, and are very brilliant. The paper, cut in sizes from 3¼in × 3¼in. to 10in. × 12in., is put up in packets at the popular price of one shilling. The packet of the former size contains thirty-six sheets, whilst the latter has only four. The paper may also be obtained by the quire in sheets 24½in. × 17in. Instead of saying it should have a large sale, we may say it *will* have a large sale.

Stop Valve.—Messrs. Husbands Bros. have sent us a description of what they claim to be a new valve, which is connected to gas cylinders. From the illustration it appears to be similar to one introduced by Messrs. D. Noakes and Son about a couple of years ago. Whilst we are well acquainted with the excellency of the latter, we cannot say anything about the merits of the former, as we have not had an opportunity of seeing it. Both valves appear to be patented.



Correspondence.

THE LIFE OF A GAS CYLINDER.

[*To the Editor.*]

SIR,—Every user of gas in cylinders, especially oxygen, must have noticed the presence of what would appear to be a powder of some sort in the cylinder itself. This is no doubt nothing more or less than oxide of iron (rust), caused by the action of the oxygen on the metal, the effect being to gradually eat away the interior of the cylinder, till a time when re-charging would be attended with danger. Now, Sir, it would, to my mind, be a desirable thing if this subject were discussed, and it would also be interesting to know what may fairly be considered the average life of an oxygen gas cylinder. Will any of your more-experienced contributors kindly state their views on this subject?—Yours faithfully,

Ryde, Isle of Wight. INQUIRER.

A FREE GIFT TO ALL LANTERNISTS.

[*To the Editor.*]

DEAR SIR,—I have had some very attractive lantern slides (coloured) sent me from the following manufacturers, which are forwarded to all lanternists who make application for them, *carriage paid*:—

1. Watson and Sons, Soapmakers, Leeds.
2. Cadbury Brothers, Bournville, Birmingham.
3. Bird and Sons, Manufacturers, Birmingham.

I am sure all your readers who make the application will be pleased with the gift, as they are made from very attractive show-cards. It would be conferring a favour upon your numerous readers (as it is not generally known that the above-named slides are presented to all who apply for them) if you would put this in your issue for July. I thank you, as a lanternist, for the help I have received through your popular *Lantern Journal*.—I am yours truly, T. CHELLEW.

Yeovil.

ILLUMINATED FOUNTAIN.

[*To the Editor.*]

DEAR SIR,—I thank you for asking Mr. Stocks to write. I have shown his letter to friends, and one is ordering a lamp by this mail.

I recently asked a friend who was on a visit to England to ascertain if anything was obtainable for showing the effect of the illuminated fountain on a small scale either by light through a fountain, or by light through the water in reservoir, or to the fall of water therefrom.

My friend could not hear of any fountain or apparatus for the effect. I should be glad to know if you happen to have heard of a dealer who kept such stock. If so, a note in your Journal giving name of maker and prices, would I think be acceptable to your readers, as it is one of the prettiest effects that can be produced by the lantern. It has often struck me that some small perpetual fountain could be devised at small cost, or a small apparatus made for showing the effect on the dropping water which could be profitably sold by dealers at a small cost.—Yours truly, JAMES CALLENDAR.

Christchurch, N.Z.,
18th May, 1892.

—:o:—

THE subject of saturators appears to be of great interest to our readers, and we will have some further communications in our next issue.

SEVERAL correspondents are informed that there are no conditions respecting who may or may not try for the prize mentioned in last issue. It is open to all (professional and amateur), and slides may either be photos or sketches.

Notes and Queries.

J. I. C.—Have repeated as desired.

G. S. asks where he can obtain a quantity of hard lime in the rough. *Answer.*—From inquiries we have made we understand that it may be obtained at the pits in Surrey, but it is useless to write there about it. The only way seems to be to attend personally, when any amount may be had for a trifle.

Quick.—We have not used the Anschutz Instantaneous Camera. Write to the Blackfriars Photo. Co., 1, Surrey-row, S.E., and they will send you full particulars.

A. T. Hare.—We will look forward to the arrival of the promised particulars.

Showman writes: "Is it possible for the same individual to work a bi-unial and give the accompanying lecture at the same time?" *Answer.*—Yes, we have often seen the same person fill both offices; but it will be evident that the party should be quite familiar with the lecture, for it is impossible to keep strictly to the text.

F. Kirkness writes: "Is it absolutely necessary, when using a bi-unial lantern furnished with blow-through jets, that a bye-pass be used for the oxygen side of the jet? The reason why I ask is that a friend tells me that Mr. Hepworth says it cannot be used without." *Reply.*—Your friend must be mistaken.

B. B.—(1) The weight of a steel cylinder to hold twelve feet of gas would be somewhere about 12lb. (2) The shield for the lime cylinder may be obtained from Mr. Wood, of Cheapside, E.C.

Th. Roberts.—The style of lens you speak of is a good one, but we are inclined to think the price a fancy one.

Rev. S. G. Poole (Ontario) writes: "I read an article from your *Magic Lantern Journal*, respecting a new saturator for the lantern; where can it be obtained?" *Ans.*—The inventor is Mr. Lawson, Rectory View, Newton-le-Willows, Lancashire. We have sent your letter to him; doubtless he will write you.

F. W. Holland (New Zealand).—Your communication *re* chromo-litho pictures, had been sent to Messrs. Theobald, of Farringdon-road, who say they will communicate with you at once.

J. H. writes: "Will you kindly through 'Notes and Queries,' give me a little information to the two following queries:—(1) I have a new gas bag, which leaks so badly, that gas should last two hours, does not last a third of that time. Can you kindly inform me where I can send it to have it seen to, as I cannot find out the leak myself? (2) How is the focus of a lens determined? A book I have says that to get a 12ft. picture, with a lens of 4in. focus, I should be 9ft. from the screen. Can you tell me how to find the focus of the lens? *Reply*: (1) Any local shop where mackintoshes are sold would be able to repair the leak; if you could repair it yourself, the position of leak can readily be ascertained, by dipping any suspected corners under water when the bag is full, and watching for air bubbles.—(2) What book did you read such nonsense in? We would like to see it. The distance required would be 16ft., and not 9ft., as stated. You will find full particulars of relative distances in a table we published in page 41 of this Journal for Oct., 1890. To find the focus, hold the lens a short distance from a sheet of paper fastened say on the wall of a room opposite the window; move the lens to or from until distant objects are quite distinct on the paper. The distance from the paper to that part of the lens where the stop goes is the focus.

Amateur writes: "What is the meaning of F8, F16, &c. with regard to the stops for a lens, and how am I to know the relative sizes?" *Answer.*—Supposing a lens to have a focus of 8in., a stop having an aperture of one-eighth of the focus, or 1in., will be F8; while one of one-sixteenth of the focus, or ½in., will be F16.